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estimated at from six to five hundred specimens in the fuller sets, with smaller ones as low as two hundred species. Some of these plants are new, many are rare, and indeed Oregon plants generally are scarce in all but the older herbaria of this country. So that these specimens, generally very nice and complete ones, and in limited quantity, are likely to be taken up at once. As Mr. Hall may soon leave Illinois upon another exploration, application for these collections may be addressed to Mr. Charles Wright, Harvard University Herbarium, Cambridge.—A Gray.

Dispersion of Spores.—A. E. de Moravia mentions in "Science Gossip" a carrot-colored fungus (Peziza aurantia), about two inches broad, which when blown upon emitted a dense cloud of spores, with a distinct "fizzing" sound. Its spores were arranged in long tubes (asci) opening on the surface, but no spiral springs or other means of emission could be detected.

ZOOLOGY.

Serpents Warmed by a Lizard.—In the same glass case were two horned frogs (Phrynosoma, and really not frogs at all but lizards), and two young serpents, the milk snake and the red-bellied snake, each about ten inches long; when the sunshine left the window-sill on which the case rested, the two serpents coiled themselves together under one of the lizards, and were completely hidden by it, as if seeking protection from the chill air of the evening.—Burt G. Wilder.

Flying Spiders.—At Providence, R. I., Oct. 22, about 9 A. M., with the thermometer at 55° and a strong breeze from the south, I saw numbers of small Lycosas run up the pickets of a fence and when near the top, raise themselves as high as possible by straightening their legs, and turning their abdomen upwards. Immediately afterward some of them were blown off from the fence and carried away in a nearly horizontal direction.

One, after leaving the fence, settled to within a foot of the ground, and then moved slowly northward horizontally about twenty feet, where I lost sight of it. Another blew against me, and a thread extending upward caught on my face. Four others were blown from the fence so quickly that I could not follow them with my eyes. The spiders were about a sixth of an inch long and were probably young.

On the 19th of November, which was an unusually fine day for the season, with the thermometer about sixty degrees and a light breeze from the south-east, I saw thousands of the same little Lycosas on the tops of fences around Providence running about and every few minutes raising themselves on tip-toe with their heads to the wind and turning their abdomens up in the air. They were very easily disturbed by the near approach of any object and would either run down the fences or lay themselves down so as to be hardly visible. I succeeded however, in bringing my lens near enough to several of them while their abdomens were elevated to see the thread passing from their spinnerets. It seemed to come from the small middle pair only, but the posterior pair were in constant motion, folding together over the middle ones and then spreading apart as if to help out the thread. Occasionally, one succeeded in being blown from its position and carried along by the wind, sometimes horizontally, sometimes descending gradually as it went, but usually upward, sometimes at as high an angle as forty-five degrees from the horizon. The upper part of the thread preserved the direction which it had at starting while the lower end was drawn down in a curve by the weight of the spider. They were usually supported by one thread only, but in one instance I saw three threads passing from the spinnerets at once. In another a single thread hung down from the spider while supported by another thread in the air.

Most of the spiders hung by their spinnerets only and drew their legs close against their bodies. Others extended their legs sideways and one seemed climbing the thread as he went up.

I first noticed the spiders ascending about 10 A. M., and they continued to do so until 4 P. M., though less frequently in the afternoon.

The threads spun in their unsuccessful attempts were streaming in countless numbers from fences, trees, posts and telegraph wires, and the dried grass in a pasture looked as if covered with one great cobweb.—J. H. EMERTON.

EMBRYONIC LARVÆ OF BUTTERFLIES.—Under this head Mr. S. H. Scudder publishes an article in the "Entomologist's Monthly Magazine." He points out the probable universality of the law that caterpillars of butterflies present greater structural differences between the embryonic and adult stages of the same individual, than are to be found in the adult larvæ of allied genera. By the term "embryonic" he designates those caterpillars which have not changed their condition since leaving the egg, a stage in which they generally continue but one or two days. Some of the changes alluded to are more or less gradual in their appearance, but they generally occur at the first moulting of the caterpillar.

He incidentally remarks that in studying caterpillars "the shape and sculpturing of the head, the form of certain segments, and especially the precise number, location and disposition of the spines, thorns, and hair-emitting warts of the body will be found to furnish abundant means of distinguishing the most closely allied and minutely subdivided genera."

The differences he proceeds to describe "are not always in the same direction; for we have seen that caterpillars which in infancy are clothed with appendages of a unique and conspicuous character, definitely disposed, display in mature life irregularly distributed, scarcely perceptible warts, emitting simple and nearly microscopic hairs; while others, which in their earliest stage bore regular series of simple hairs seated on little warts, become possessed at maturity of compound spines, surmounting mammulæ, also definitely arranged, but occupying a very different position to the hairs of early life. So, too, we find some caterpillars which bear a tuberculated irregular head in infancy, and a smooth and equal one at maturity; or the reverse, when the head is simple at birth, and heavily spined or cornute when full grown; others, again, remain almost unchanged through life. This latter condition of uniformity never applies to the appendages of the body, whether we consider their characters alone, or their disposition. Nor—the only other possible condition—do we ever find larvæ bearing only irregularly distributed, simple, minute hairs in infancy, and regularly arranged special appendages at maturity. Indeed, it is doubtful whether such a phenomenon exists in nature; since in the numerous and varied groups that have been examined, special dermal appendages have been found to be an invariable characteristic of embryonic larvæ."

PROPAGATION OF SALMON.—During the past season the first attempt to obtain eggs of the sea-going *Salmo salar* within the limits of the United States was made at Orland on the Penobscot River; and as this was also the first authenticated experiment of confining salmon for breeding purposes through the summer and fall, it deserves some mention. It was necessary to buy live salmon of the fishermen near Bucksport in the early part of the summer, because later in the season they are scattered over the head waters of the river in the wilderness. It was found that in common brook, river, or pond water of sufficient depth and flow, the salmon would remain in perfect health from June till November. A pond specially prepared for them in a very clear, cold brook proved unsuitable, and every salmon placed there died. The seventeen fish that remained at hand in the beginning of the spawning season were kept in a pound built of stakes and nets on the margin of a large pond. The area enclosed was some fifteen or twenty square rods, and the depth of water about six feet at the deepest point. Confinement within this narrow enclosure does not appear to have hindered in the least the development of the spawn and milt. Ten out of the seventeen were found to be females and nine of them yielded eggs freely. The method of fecundation differed from that commonly employed, in that the eggs and milt were carefully kept from water until they had come in contact. This method is of Russian origin. It was in this case remarkably successful. About ninety-six per cent. of the eggs were fecundated. They were taken between the 2d and 10th of November, and on Dec. 18th they were packed up, to the number of seventy thousand, five hundred, and distributed in nearly equal proportions to the three States of Maine, Massachusetts and Connecticut.

The conditions under which the seventeen salmon were kept preclude the idea that they could obtain any considerable amount of food, and there is no good reason for thinking that they ate anything at all after they were brought from the salt water in which they were caught. They slowly fell away in flesh, and at the spawning season were very gaunt, compared with their condition in June. More noteworthy was their change in color and shape. In color they were darker, with clusters of red spots on the sides, and a general reddish tinge covered the lower parts of the body in nearly all cases. These colors and markings were dull and indistinct in the females, but were very bright in most of the males. In shape the females had undergone some change about the head, but it was not remarkable. In the males, however, the alteration was very marked. The sides were flat and broad, the back arched high, the head seemed disproportionately large, the jaws were long and curved. At the extremity of the lower jaw was a large, curved process that shut into a cavity in the roof of the mouth. There was, indeed, between the two sexes as great a difference as there is between the male and female of our common domestic fowls. Yet in June there was so little difference that only a practised eye could distinguish the male from the female salmon. The fishermen who had been handling them all their lives had never observed the difference.

During the process of spawning and after its completion both sexes continue to fall away in flesh and soon the colors begin to fade. At the end of a month the process on the lower jaw is found to have decreased in size. Two females and one male taken from the water on the 23d of November, thirteen days after the completion of the spawning, were forwarded to the Peabody Academy of Science. To the same institution was sent another specimen, a male, that was put, early in July, into a pond of one or two hundred acres in Bucksport, and running into a brook in November, was taken thence after ten days. This was the finest specimen seen, a strong, stout-built fish thirty-four inches long and weighing eleven and a half pounds. His colors were unusually deep, perhaps in consequence of the deep reddish color of the water, through which nothing could be seen at the depth of three feet.—C. G. A.

AN ORNITHOLOGICAL BLUNDER.—Having submitted the case of "Bonasa Jobsii" (*Jaycox;* "Cornell Era," IV, 182) to an ornithologist, requesting him to pass upon it, we are favored with the following reply:—"Newspaper science is rarely worth serious attention, but as the 'Era,' a publication of an institution of learning, notices a supposed new species of bird which, it appears, is named by the President of the University, although described by another gentleman, I suppose the article must be recognized, to the extent at least of blaming it for introducing a new synonym of the ruffed grouse. It is such a complete fiasco, and at the same time is written with such ingenuousness, that I cannot do what you ask and spare the writer's feelings too. I must say that not one of the 'striking differences' that Mr. Jaycox thinks 'are sufficient to characterize a new species and perhaps a new genus,' are of the slightest consequence. *Bonasa umbellus* usually has eighteen tail feathers, but is also found with sixteen, as well as twenty, as in this instance. The alleged difference in proportions of tarsus and middle toe is within the ordinary range of individual variation; while the points of color adduced may be matched in almost any game bag — indeed, I do not see how the writer ever discovered them, intent as he says he was on the edible qualities of the bird, to which he had better have confined his investigations. He is not to blame, of course, for knowing nothing of ornithology, but he ought not to have rushed into print on the subject, when any ornithologist would willingly have examined his specimen for him, and kept him out of a scrape. If you think this bears down too hard on the writer, ease it up a little; but I really think that Mr. Jaycox will in the course of time thank you for printing it; I remember that just such raps did some of my early lucubrations good."

Albinism and Melanism. — In the November number of the Naturalist is an article on a "Singular Albino," an "albino bobolink" (*Dolichonyx oryzivorus*) "illustrating a rare and curious condition," being "of a uniform pale yellow, exactly like a canary bird."

I would like to ask the writer or any of the readers of the Naturalist if they have ever seen an albino bobolink marked otherwise. I have one taken in this vicinity which perfectly answers to the description given above. It looks precisely like a yellow canary with the exception of size and pointed tail feathers. The remark is frequently made by those visiting my collection, "what a large canary that is." This is the only albino bobolink that I have seen, and it may be unusually marked, yet the description in the Naturalist so exactly corresponds to the one in my cabinet, that the thought occurs to me that this perhaps may be the usual color of the albino of this species. Although albino signifies white, yet there may be various shades of white. I find this statement verified in my own collection. Before me is an albino mink (*Putorius bison*), muskrat (*Fiber Zibethicus*), two wharf rats (*Mus decumanus*), two house mice (*Mus musculus*), pure white, and also an albino red squirrel (*Sciurus Hudsonius*), meadow mouse (*Arvicola riparius*), blue-bird (*Sialia sialis*), two robins (*Turdus migratorius*), barn swallow (*Hirundo horreorum*), cliff swallow (*Hirundo lunifrons*), white, but not pure white. They are more of a dingy white. In the bobolink described above, it might be called yellowish white. In the albino the eye is always red.

Albinism is much more common than melanism—the latter is seldom found. In my collection of about two thousand specimens of birds and animals (one thousand mounted) there is but one specimen of melanism, a black woodchuck (*Arctomys monax*).—Wm. Wood, M.D., *East Windsor Hill*, *Conn.*

Dredgings in the Gulf of St. Lawrence.—Mr. J. F. Whiteaves has during the past summer, according to "Nature," dredged in from fifty to two hundred and fifty fathoms in the Gulf of St. Lawrence. At a depth of one hundred and sixty and two hundred fathoms a number of sea pens (*Pennatulæ*) were dredged, this genus not having previously been found on the Atlantic coast of America. A Spatangus also occurred; and the following shells, which are new or very rare on this side of the Atlantic:—*Pecten Grönlandicus* Chemn. not Sowb., *Arca pectunculoides* Sacchi, *Yoldia lucida* Lovèn, *Y. frigida* Torell, *Neæra arctica* Sars, *N. obesa* Lovèn, *Dentalium abyssorum* Sars, *Siphonodentalium vitreum* Sars, *Eulima stenostoma* Jeffreys, *Bela Trevelyana*, *Chrysodomus* (Sipho) *Sarsii*, and *C. Spitzbergensis*, the latter shell occurring in shoal water.

The Origin of Insects.—At a meeting of the Linnæan Society of London held on November 2d, Sir John Lubbock, Bart., F.R.S., read a paper on this subject, which has always presented one of the most difficult problems to the Darwinian theory. There is great difficulty in conceiving by what process of natural selection an insect with a suctorial mouth like a gnat or a butterfly could be developed from a powerful mandibulate type like the Orthoptera, or even the Neuroptera. M. Brauer has recently suggested that the interesting genus Campodea is, of all known existing forms, that which most nearly resembles the parent insect stock, from which are descended, not only the most closely allied Collembola and Thysanura, but all the other great orders of insects. In these insects we have a type of animal closely resembling certain larvæ, which occurs in both the mandibulate and suctorial series of insects, and which possesses a mouth neither distinctly mandibulate nor distinctly suctorial, but constituted as a peculiar type, capable of modification in either direction by gradual changes, without loss of utility. The complete metamorphosis of the Lepidoptera, Coleoptera and Diptera, will then be the result of adaptive changes brought about through a long series of generations.—A. W. B.

Change in the Habits of a Bird.—The New Zealand papers state that in certain districts in those islands the sheep are being constantly attacked by the Kea or "mountain parrot" (*Nestor notabilis*), belonging to the family of Trichoglossina or Brush-tongued parrots, which infests the neighborhood. These birds are seen sticking to a sheep and pecking at it producing a patch of raw flesh on the loin about the size of a man's hand, from which matter continually runs down the side, taking the wool completely off that part which it touches, and in many cases causing death. The fact is of interest, as affording an instance of entire change of habit within a comparatively recent period. The Kea, like other birds of the family to which it belongs, was originally a fruit-eater, or occasionally feeding on insects concealed in the crevices of bark and rocks. It is only since the colonization of New Zealand by Europeans that sheep or other large mammals have been introduced. The parrots are also frequently seen tearing at the skins of sheep which have been hung up to dry, and they were probably first tempted by these when their natural food ran short in the winter.—A. W. B.

Reproduction of Sturgeon.—The following observations on the sturgeon of the Volga by Professor Owsjannikow and others are recorded in the "Bulletin of the Acclimatization Society" of Paris. The sterlet (*Acipenser ruthenus*), the smallest of the Russian sturgeons, spawns in the Volga early in May on rocky bottoms, the temperature of the water being at 10° R. ($= 54\frac{1}{2}°$ F.). The eggs are readily fecundated by the artificial method. After they have been in the water a few minutes they adhere to any object which they touch. The development of the embryo can be observed in progress at the end of one hour. On the seventh day they hatch. At first the young fish are $0^{m}.007$ (about $\frac{27}{100}$ inch) long. At the age of ten weeks they are nearly two inches long. They feed on larvæ of insects, taking them from the bottom. Both in the egg and when newly hatched, the sterlet has been taken a five days' journey from the Volga to Western Russia, and in 1870 a lot of the eggs were carried to England to stock the river Leith. This species passes its whole life in fresh water. The other species inhabiting the Baltic, *Acipenser sturio*, *A. Huso*, *A. stellatus* and *A. Güldenstädtii*, are anadromous. These species hybridize, and freely, and from this circumstance some Russian savants have pronounced them only varieties instead of species.—C. G. A.

Partial Development of Eggs without Fertilization.—Hensen has observed that the eggs of rabbits, unimpregnated and within closed cysts, developed themselves into polynucleated protoplasmatic masses and fibres. Kupffer also noticed that in Ascidia there arises in the egg before impregnation a peripheral layer of cells which, later on, after impregnation, becomes the external covering of the animal. More recently, as we learn from the "Quarterly Journal of Microscopy", Œllacher has observed the remarkable fact that even in warm blooded vertebrata the first act of embryonic development, namely, segmentation, may take place independently of impregnation.

Flora and Fauna of the Azores.—The most striking fact brought out by Godman's "Natural History of the Azores, or Western Islands," is the wonderful amount of similarity between the productions of these remote islands and those of Europe; from eighty to ninety per cent. of the birds, butterflies, beetles and plants being absolutely identical with common European species, while from one to four per cent. only are American. This is the more remarkable when we turn to physical maps for information and find that both the oceanic and aërial currents are from the westward, so that we should naturally expect the American element of the fauna and flora to be much better represented. The difficulty, however, is to a great extent cleared up by Mr. Godman's observation that the Azores lie in a region of storms from all points of the compass; and that every year these storms bring numbers of birds from Europe, and no doubt also numbers of insects, although these are not so easily observed. We can thus account for the enormous preponderance of European species; and this, taken in conjunction with the entire absence of indigenous Mammalia and Reptiles, causes our author to reject the theory of a common continental extension uniting these islands to Europe as the origin of their fauna and flora. Had this been so, and taking into consideration the vast time implied by the descent of a thousand miles of country to the depth of fifteen thousand feet, we should certainly have found the productions of the Azores to be far more endemic and peculiar than those of Madeira and the Canaries, instead of far less so.

The most curious and difficult problem is presented by the existence of a considerable number of wingless beetles of genera peculiar to the Atlantic islands (Azores, Madeira, Canaries). These could not possibly, in their present condition, have been transported over the six hundred miles of ocean that now intervene between these groups. Mr. Wollaston has, however, discovered that beetles have a tendency to become apterous in these islands; many which are winged in Europe, or belong to winged genera, being altogether wingless in Madeira and the Canaries. Some of these wingless species differ in no other respect from their European allies, so that we may be sure the change has been effected in a comparatively limited time; and the fact that some European species possess both winged and wingless individuals shows that the character is an unstable one, and therefore easily abolished or retained as one or the other state becomes advantageous to the species. We are thus at liberty to suppose that these wingless Atlantic groups are the descendants of very remote winged ancestors, who were among the earliest immigrants to all these islands; and these being subjected to similar conditions, all became apterous. Another strange phenomenon is presented by the *Elastrus dolosus*, a beetle of the family Elateridæ which belongs to a genus peculiar to Madagascar. A single plant, *Myrsine Africana*, a native of tropical Africa and the Cape of Good Hope, is found in no other group but the Azores where it seems to be common. As another beetle of the same family (Elateridæ) is allied to a Brazilian species and is therefore probably the descendant of an ancestor who came over in a floating log, we are led to speculate on the possibility of this anomalous Madagascar beetle and S. African plant having been introduced by a similar process; since the currents round the southern extremity of Africa partially merge into the great equatorial current of the Atlantic which gives rise to the Gulf Stream, and this undoubtedly reaches the Azores.

Mr. Godman had previously visited the Galapagos Islands, which are only half as far from South America as the Azores are from Europe, yet they contain hardly any identical species of birds, plants or insects. This is well explained by the fact that these islands are situated in a region of calms instead of one of storms; and chance introductions being therefore a far rarer occurrence, the early immigrants have all become modified, and have so stocked the country with their peculiar and well adapted forms that new comers (if any do come) have little chance of establishing themselves. — ALFRED R. WALLACE, *in the Academy.*

CIRCULATION IN INSECTS.— Mr. H. N. Moseley finds the circulation of insects to be observed most advantageously in the wings of *Blatta orientalis*. The details and results of his methods of observation are given in the "Quarterly Journal of Microscopical Science." When *B. orientalis* casts its skin it emerges quite soft and milk-white: at which time light may be thrown through the body, and the action of the heart and valves studied to advantage. The circulatory system of insects is injected with difficulty from the heart: a more certain result is obtained by cutting off half of one wing and injecting, through the cut edges, either the removed portion of the wing, or the remaining portion and through it the heart. Indigo-carmine, or Berlin blue solution, is preferred as the injecting fluid. Mr. Moseley places the fluid in a short india-rubber tube closed at one end and furnished with a canula at the other, and forces it into the insect's veins by pressure of the finger upon the tube; a procedure which would seem to be applicable to many other cases.—R. H. W.

GEOLOGY.

THE CHANTAUQUA MASTODON.—The remains of a skeleton, belonging to the extinct species of animal, *Mastodon giganteus*, were discovered the twenty-fifth of August, 1871, in the vicinity of Jamestown, N. Y. These remains were found imbedded four feet below the surface, in soil composed of peat and marl, and deposited in the Post-tertiary period; and were located in a swamp, two acres in extent, situated upon a farm now owned by J. E. Hoyt, formerly known as the Reynolds place, about one mile north of the village of Jamestown. This small swamp, fed by springs, had been drained five years ago, and last August workmen were excavating the muck, scattering it upon a four-acre field, when they finally came to the tusks estimated to be *twelve* feet in length before they were much disturbed or broken. They found also, in proximity to the visceral cavity of the larger skeleton, a mass of undigested food, some eight or nine bushels in quantity, and consisting of slightly decayed twigs, of two or three inches in length, identified as cone-bearing species, similar to our pines and firs, and remarkably preserved.

At the time of my visit, upon the 16th of September, the remains were deposited mainly in the cabinet of the "Union School